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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/870,986	06/01/2001	Ravi F. Saraf	00-151(01640259AA)	7552

30743 7590 03/11/2003

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EXAMINER
CHAKRABARTI, ARUN K

ART UNIT	PAPER NUMBER
1634	

DATE MAILED: 03/11/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)
09/870,986	Saraf
Examiner	**Art Unit**
Arun Chakrabarti	1634

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *Mar 29, 2002* .

2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above, claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-23* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
4) ☐ Interview Summary (PTO-413) Paper No(s). _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☒ Other: *Detailed Action*

DETAILED ACTION

Specification

1. Claims 1, 3, 11, 12, and 20 have been amended.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 1-5, 7, 13-17, and 19-20 are rejected over Leland et al. (U.S. Patent 5,962,218) (October 5, 1999) in view of Charra (U.S. Patent 5,831,259) (November 3, 1998).

Leland et al teach a method to detect binding of molecules, comprising the steps of:

a) providing a sensor comprised of a single stranded nucleic acid sequence and a photoluminescent material;

b) exposing the sensor to a biological sample for sufficient time for the single stranded nucleic acid sequence to bind a material of interest in the biological sample;

c) exposing the sensor to light and measuring photoluminescence from the sensor (Claim 1 and Column 7, line 23 to column 8, line 46).

Leland et al teach a method , wherein the single stranded nucleic acid is different DNA molecules having 5-200 base pairs (Figures 4-5 and Examples 29-30).

Leland et al do not teach a tagging free method, providing a first layer comprising a single stranded nucleic acid sequence and a second layer comprising a photoluminescent material of aromatic polymers embedded in the matrix material.

Charra teach a tagging free method, providing a first layer comprising a single stranded nucleic acid sequence and a second layer comprising a photoluminescent material of aromatic polymers embedded in the matrix material (Abstract and Figures 1-4 and column 4, lines 1-67).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine and substitute the tagging free method, providing a first layer of oligomer and a second layer of photoluminescent material consisting of aromatic polymers embedded in the matrix material of Charra in the process of Leland et al., since Charra states, "In the present invention, the use of reduced size oligomers decreases the mobility of the charges and therefore minimizes energy consumption (Column 5, lines 40-42)." By employing scientific

reasoning, an ordinary practitioner would have combined and substituted the tagging free method, providing a first layer of oligomer and a second layer of photoluminescent material consisting of aromatic polymers embedded in the matrix material of Charra in the process of Leland et al in order to improve the process for determining the hybridization of a nucleic acid sample. An ordinary practitioner would have been motivated to combine and substitute the tagging free method, providing a first layer of oligomer and a second layer of photoluminescent material consisting of aromatic polymers embedded in the matrix material of Charra in the process of Leland et al., in order to achieve the express advantages, as noted by Charra, of an invention that provides use of reduced size oligomers which decreases the mobility of the charges and therefore minimizes energy consumption.

4. Claims 1-7, 11-17, and 19-20 are rejected over Leland et al. (U.S. Patent 5,962,218) (October 5, 1999) in view of Charra (U.S. Patent 5,831,259) (November 3, 1998) further in view of Leising et al. (U.S. Patent 6,117,529) (September 12, 2000).

Leland et al in view of Charra teach a method of claims 1-5, 7, 13-17, and 19-20 as described above.

Leland et al in view of Charra do not teach a matrix layer comprising polystyrene.

Leising et al .teach a matrix layer comprising polystyrene (Column 5, lines 5-36).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine and substitute a matrix layer comprising polystyrene of Leising et al in the process of Leland et al .in view of Charra, since Leising et al. state, "Such

matrices therefore enhance the resolution (Column 15, lines 35-36)." By employing scientific reasoning, an ordinary practitioner would have combined and substituted a matrix layer comprising polystyrene of Leising et al in the process of Leland et al. in view of Charra in order to improve the process for determining the hybridization of a nucleic acid sample. An ordinary practitioner would have been motivated to combine and substitute a matrix layer comprising polystyrene of Leising et al in the process of Leland et al. in view of Charra, in order to achieve the express advantages, as noted by Leising et al, of such matrices which enhance the resolution.

5. Claims 1-5, and 7-23 are rejected over Leland et al. (U.S. Patent 5,962,218) (October 5, 1999) in view of Charra (U.S. Patent 5,831,259) (November 3, 1998) further in view of Bhargava et al. (U.S. Patent 6,241,819 B1) (June 5, 2001).

Leland et al in view of Charra teach a method of claims 1-5, 7, 13-17, and 19-20 as described above.

Leland et al in view of Charra do not teach doped or undoped zinc sulfide in a nanocomposite.

Bhargava et al teach doped or undoped zinc sulfide in a nanocomposite (Abstract and Column 3, line 45 to column 4, line 4, and Claims 1 and 20).

Leland et al in view of Charra do not teach the use of ultraviolet light with wavelength in the range of 200-700 nm.

Bhargava et al teach the use of ultraviolet light with wavelength in the range of 200-700 nm (Abstract and Column 3, line 45 to column 4, line 21, and Figure 2).

Leland et al in view of Charra do not teach the first layer positioned on a first side of the second layer, and the second side is opposite the first side on the second layer and the measuring step measures photoluminescence reflected from the first and second side of the second layer.

Bhargava et al teach the first layer positioned on a first side of the second layer, and the second side is opposite the first side on the second layer and the measuring step measures photoluminescence reflected from the first and second side of the second layer (Column 2, line 65 to column 4, line 49).

It would have been *prima facie* obvious to one having ordinary skill in the art at the time the invention was made to combine and substitute the doped or undoped zinc sulfide in a nanocomposite and the use of ultraviolet light with wavelength in the range of 200-700 nm of Bhargava et al in the process of Leland et al. in view of Charra, since Bhargava et al. state, "The present application also provides methodology for manufacturing quantum size doped semiconductor particles. The methodology is particularly advantageous in that it provides a relatively simple approach to the manufacture of doped quantum sized semiconductor particles at room temperature. Furthermore, the particles so produced are dispersed within a polymer matrix and the reaction which forms the doped particles takes place in the polymer matrix. Thereafter, the polymer matrix maintains the doped particles separate from one another so that they maintain their quantum physical effects without agglomeration (Column 2, lines 6-17) " By employing scientific reasoning, an ordinary practitioner would have combined and substituted the doped or undoped zinc sulfide in a nanocomposite and the use of ultraviolet light with wavelength in the

range of 200-700 nm of Bhargava et al in the process of Leland et al. in view of Charra, in order to improve the process for determining the hybridization of a nucleic acid sample. An ordinary practitioner would have been motivated to combine and substitute the doped or undoped zinc sulfide in a nanocomposite and the use of ultraviolet light with wavelength in the range of 200-700 nm of Bhargava et al in the process of Leland et al. in view of Charra, in order to achieve the express advantages, as noted by Bhargava et al, of an invention which provides methodology for manufacturing quantum size doped semiconductor particles and which is particularly advantageous in that it provides a relatively simple approach to the manufacture of doped quantum sized semiconductor particles at room temperature and furthermore, the particles so produced are dispersed within a polymer matrix and the reaction which forms the doped particles takes place in the polymer matrix that maintains the doped particles separate from one another so that they maintain their quantum physical effects without agglomeration.

Response to Amendment

6. In response to amendment, all previous 112, second paragraph rejections have been withdrawn. However, all previous 103(a) rejections have been properly maintained.

Response to Arguments

7. Applicant's arguments filed on May 29, 2002 have been fully considered but they are not persuasive.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Applicant also argues that there is no motivation to combine the references. This argument is not persuasive, especially in the presence of strong motivations provided by Bhargava et al as Bhargava et al. state, "The present application also provides methodology for manufacturing quantum size doped semiconductor particles. The methodology is particularly advantageous in that it provides a relatively simple approach to the manufacture of doped quantum sized semiconductor particles at room temperature. Furthermore, the particles so produced are dispersed within a polymer matrix and the reaction which forms the doped particles takes place in the polymer matrix. Thereafter, the polymer matrix maintains the doped particles separate from one another so that they maintain their quantum physical effects without agglomeration (Column 2, lines 6-17) ". It is also noteworthy that the applicant concedes that Bhargava reference teaches all the elements of the claims. The same logic is applicable to all other references.

In response to applicant's argument that the Charra reference fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., two layers namely first and second layers are different and they are not connected to each other) are not recited in the rejected claim(s). Especially, in the presence of "comprising" language, any material(s) or step(s) can be added to the layers and it still reads on Charra reference. Moreover,

Charra clearly teaches two layers of oligonucleotides and photoluminescent materials, which may be connected to each other. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Applicant also argues that Charra's method could not be useful for the purpose of developing a method to detect the binding of molecules of any type. This argument is not persuasive. With regard to the preamble limitations, it is noted in MPEP 2111.02 that "a preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone." Although Charra discloses only a nucleotide and photoluminescent materials binding assays and not the method for binding any molecules, this rejection is based on the fact that method steps of combinatory references are exactly same as the claimed invention as described above and therefore the process steps or structural limitations are able to stand alone and thereby meets the requirements of the instant claims because a preamble (method for detecting binding of any molecules in this case) is generally not accorded any patentable weight where it merely recites the purpose of a process.

In response to applicant's argument that Charra has a motivation which is different from the applicant's motivation, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability

when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Conclusion

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CAR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CAR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Arun Chakrabarti, Ph.D., whose telephone number is (703) 306-5818. The examiner can normally be reached on 7:00 AM-4:30 PM from Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gary Benzion, can be reached on (703) 308-1119. The fax phone number for this Group is (703) 305-7401.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group analyst Chantae Dessau whose telephone number is (703) 605-1237.

Arun Chakrabarti,

Patent Examiner,

February 25, 2003

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